

WHAT IS CLAIMED IS:

1. An electric power steering device, comprising:

a steering unit equipped with a motor for assisting the steering power of itself;

controlling means for controlling an output of said motor according to at least a signal of a steering torque generated at a steering shaft;

wherein said controlling means includes:

motor current command value calculating means for calculating a current command value of a current to be supplied to said motor;

motor current estimating means for estimating a value of said motor current based on said current command value;

motor current detecting means for detecting a value of a current that flows in said motor;

fault detecting means for detecting a fault in said motor current detecting means by comparing said estimated motor current with said detected motor current; and

wherein said controlling means controls so that a motor current command value is set only for a time whose value is larger enough than an electrical time constant of said motor and smaller enough than a mechanical time constant of said motor, then a current control value is changed with time based on said current command value to increase a voltage applied to said

motor with time and enable said fault detecting means to compare said estimated motor current value with said detected motor current value, thereby detecting a fault in said motor current detecting means.

2. The electric power steering device according to claim 1, wherein said controlling means, when a fault is detected in said motor current detecting means, increases a voltage applied to said motor with time, starting from a voltage lower than said motor applied voltage detected at the time of fault detection, so as to detect said fault again in said motor current detecting means.
3. The electric power steering device according to claim 1, wherein said motor applied voltage is limited in maximum by a value corresponding to said mechanical time constant of said motor.
4. The electric power steering device according to claim 1, wherein said controlling means changes the duty ratio of said voltage applied to said motor with time and increase said voltage with time.
5. The electric power steering device according to claim 4,

wherein said controlling means changes the duty ratio of said voltage applied to said motor with time in one sampling operation and increase said voltage with time.

6. The electric power steering device according to claim 4, wherein said controlling means changes the duty ratio of said voltage applied to said motor according to an increase of the number of sampling operations and increase said voltage with time.

7. An electric power steering device, comprising:

a steering unit equipped with a motor for assisting the steering power of itself;
controlling means for controlling an output of said motor according to at least a signal of a steering torque generated at a steering shaft;

wherein said controlling means includes:
motor current command value calculating means for calculating a current command value of a current to be supplied to said motor;

motor current detecting means for detecting a current that flows in said motor;

current deviation calculating/proportionally integrating means for calculating each difference between a

motor current command value and a detected motor current and integrating calculated difference proportionally for outputting a current control value; and

fault determining means for determining that said motor current detecting means is defective when said detected motor current is not within a predetermined limit value;

wherein said controlling means controls so that said motor current command value is set only for a time whose value is larger than said electrical time constant of said motor and smaller than said mechanical time constant of said motor to drive said motor with a voltage to be set based on the current control value output from said current deviation calculating/proportionally integrating means so as to enable said fault determining means to determine a fault of said motor current detecting means.

8. The electric power steering device according to claim 7, wherein said controlling means increases said voltage applied to said motor up to a value that breaks an oxide film formed on a contact surface between a commutator and a brush of said motor.

9. The electric power steering device according to claim 7, wherein said fault determining means determines a fault of said

motor current detecting means according to each detection result of said motor current detecting means obtained in a plurality of motor current sampling operations.

10. The electric power steering device according to claim 9, wherein said fault determining means does not determine that said detected motor current detecting means is defective immediately when said detected motor current includes values that are both within said predetermined limit value and not within said predetermined limit value in said motor current sampling results obtained through a plurality of sampling operations, and said fault determining means determines that said motor current detecting means is defective when said detected motor current includes a value not within said predetermined limit value in said sampling results obtained through a plurality of sampling operations, or said detected motor current values include a value not within said predetermined limit value in said sampling results obtained in correspondence with said voltage applied to the motor increased step by step in time series.

11. The electric power steering means according to claim 9, wherein said fault determining means determines that the motor

current detecting means is defective when a plurality of motor currents that are not within said limit value are detected consecutively in detection results obtained through a plurality of sampling operations performed by said motor current detecting means.

12. The electric power steering device according to claim 7, wherein said motor applied voltage is limited in maximum by a value corresponding to said mechanical time constant of said motor.